PATENT SPECIFICATION (11) 1 537 636

1 537 636

(21) Application No. 48801/77 (22) Filed 23 Nov. 1977 (19)
(31) Convention Application No. 751 779 (32) Filed 17 Dec. 1976 in
(33) United States of America (US)
(44) Complete Specification published 10 Jan. 1979
(51) INT. CL.[2] G04B 39/00
(52) Index at acceptance
G3T A2B A2C


# (54) CRYSTAL ASSEMBLY FOR A TIMEPIECE

(71) We, TIMEX CORPORATION, a Corporation organized under the Laws of the State of Delaware, United States of America, of Waterbury, Connecticut 06720, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a crystal assembly for timepieces.

More particularly, the invention describes a rotatable crystal assembly by means of which a timepiece is enabled to achieve a wide variety of special visual effects in addition to telling the time in a conventional manner, for example to achieve a variety of changing visual patterns and colour effects, display of ornamental designs or personalized information and/or display of different time zones, elapsed time or other useful information depending on the marking indicia, materials or scales used.

Watches for achieving special visual effects in addition to telling the time are well known in the art. Watches with manually rotatable bezel rings for providing 24-hour markings or reading the time in another time zone, or measuring elapsed time, are known.

Constructions are known in which the bezel and crystal attached to the bezel are rotatable as a unit and carry logarithmic scale indicia to provide a circular slide rule.

Also known are watches with fixed sealed crystals and transparent overlay members disposed outside of the fixed crystal which are rotatable or carrying time indicating indicia, as shown for example in U.S.A. Patents 2,462,839; 1,796,652; 1,064,770 and 2,939,420. Finally, various patents are known using stationary crystals of polarized or coloured material or marked with symbols or designs, which co-operate with internal discs or hands of polarized or coloured material or marked with symbols or designs. These are exemplified by Swiss Patents 354,031 and 324,755 and U.S.A. Patent 3,595,009.

The possibilities for special visual effects are virtually limitless and it is an object of the present invention to provide a construction enhancing the ability to provide such special effects.

According to the invention there is provided an assembly of a conventional crystal for mounting in the case of a timepiece to cover the dial and rotatable time indicating members, and a supplementary crystal, wherein the supplementary crystal is disposed on the exterior of said conventional crystal and is mounted thereon so as to be manually rotatable with respect thereto.

The invention also provides a timepiece comprising a case, rotatable time indicating members and a dial, and a crystal assembly as specified above whereof the conventional crystal is mounted on the case so that said crystals cover the time indicating members.

A manually rotatable bezel ring and/or a rotatable "seconds" disc in place of the normal "seconds" hand may be used in conjunction with the supplementary crystal. A bezel ring extension on the supplementary crystal, or a second supplementary crystal outside of the first supplementary crystal, may also be provided.

The above and other preferred features of the invention will be further understood from the following description of preferred embodiments of the invention, reference being made to the accompanying drawings, in which:—

Figure 1 is a partial elevation drawing, in cross-section, of a timepiece, illustrating one embodiment of crystal assembly, and upper case, bezel, time indicating members and dial of the timepiece, but omitting a conventional movement and lower case details;

Figure 2 is an enlarged partial cross-sectional elevation showing details of the crystal and bezel ring mounting assembly;

Figure 3 is a view similar to Figure 2, but showing another embodiment of the invention; and

Figure 4 is a view similar to Figure 2, showing a further embodiment.

Referring to Figure 1 of the drawings, a conventional timepiece includes a base 1 containing a movement 2 arranged to drive an hour hand 3, a minute hand 4 and a "seconds" indicator 5. The seconds indicator

in its preferred form here is a substantially transparent disc which may alternatively be of polarized material, of coloured material, or carry special visual indicia such as scribed markings or fanciful symbols or drawings as desired. The rotating members 3, 4, 5 register with markers 6 on a dial 7 so that time can be read in the conventional manner.

The watch case 1 defines a circumferential groove 1*a* and an inwardly directed flange 1*b* which co-operates to hold the rim of a conventional stationary transparent crystal 8 by interference fit in a known manner against a frusto-conical surface 8*c* of the crystal. An additional ring 11 may assist resistance to entry of water, dust or moisture.

Case 1 also includes an outer circumferential groove 1*c* for mounting a rotatable bezel ring 9. The bezel ring 9 has an upper surface 9*a* carrying visual indicia such as a 24-hour scale, elapsed time, logarithmic scale, etc. The lower lip of bezel ring 9 is bifurcated to provide a flexible circumferential flange 9*b* which can be deflected to snap the bezel ring into place in groove 1*c* and permit the bezel to be rotated manually with respect to the watch case 1. A knurled portion 9*c* permits easy turning of the bezel ring.

In accordance with the present invention, the conventional crystal 8 serves as a base for mounting a supplementary crystal 10 disposed outside of crystal 8 and manually rotatable thereon. Preferably, the supplementary crystal 10 is mounted by means of an inwardly directed circumferential lip 10*a* carried in an outer circumferential groove 8*a* on the conventional watch crystal 8 adjacent the rim thereof. The crystals 8, 10 may be formed e.g. moulded from substantially transparent plastics material such as an acrylic or a polycarbonate. The crystals 8, 10 are preferably provided with parallel frusto-conical surfaces at their outer peripheries such as 8*b*, 10*b* respectively, and these may include logarithmic scales, elapsed time, or time zone indicia. Also the crystals 8, 10 may be manufactured by affixing polarizing plastics materials, such as Polaroid Corporation Type No. THM 46, to a crystal member whereby rotation of crystal 10 relative to crystal 8 will increase or decrease the light transmission capabilities of the combined crystals. Alternatively, the inner crystal 8 or outer crystal 10 may be manufactured of polarizing material and the "seconds" disc 5 may be of polarizing material or have polarizing sections therein to provide moving or pulsating visual effects as the "seconds" disc rotates. Alternatively, pictures or symbols may be applied to any of the members 5, 8, 10 or 9 to achieve any aesthetic, personalized or functional visual effect desired.

Figure 3 shows a modified embodiment of the invention. The conventional crystal 8 is mounted in a watch case 12 in the same manner as illustrated in Figures 1 and 2. The case 12 is modified to include a sloping surface 12*a* on its periphery. The supplementary crystal 13 is mounted in the same manner as before on the inner crystal 8 by means of an inwardly directed circumferential lip 13*a* disposed in the circumferential groove 8*a* on the crystal 8. However, the supplementary crystal is als provided with a radial extension 13*b* forming a rotatable bezel ring integral with the supplementary crystal. Either the upper surface 13*c* or lower surface 13*d* of bezel extension 13*b* may carry visual indicia as before which can also register with visual indicia on surface 12*a* of the case to produce special effects or provide supplemental informatiion.

Referring to Figure 4, a further embodiment of the invention is illustrated where the watch case 1 carries the conventional crystal 8 in the manner described previously. A first supplementary crystal 14 is mounted by means of a lip 14*b* as before so as to be the first supplementary crystal includes its rotatable on crystal 8. However, in addition, own outer circumferential groove 14*a* to serve as the mounting for a second supplementary crystal member 15 having an inwardly directed lip 15*a* disposed in groove 14*a*. The crystal members 14, 15 may have gripping means such as knurled peripheries 14*c*, 15*b* respectively to permit rotation relative to one another and relative to the stationary crystal 8. The possibilities for achieving special effects are limited only by the imagination of the designer.

Assembly of the supplementary crystal is very simple and should be readily apparent from the drawings. After assembly of the conventional crystal 8 in the case, the supplementary crystal is merely snapped over it, this being permitted by the slightly frusto-conical surface 8*c* of the crystal 8 and the resiliency of the plastics material used in the crystals. The degree of ease in rotating the supplementary crystal is naturally dictated by the dimensions and materials chosen by the skilled designer.

WHAT WE CLAIM IS:—

1. An assembly of a conventional crystal for mounting in the case of a timepiece to cover the dial and rotatable time indicating members, and a supplementary crystal, wherein the supplementary crystal is disposed on the exterior of said conventional crystal and is mounted thereon so as to be manually rotatable with respect thereto.

2. An assembly as claimed in Claim 1, wherein said conventional crystal has a circumferential groove in its outer surface adjacent the rim thereof and said supplementary crystal member has an inwardly directed circumferential lip disposed in said groove, whereby said groove and said lip serve to

support the supplementary crystal for manual rotation with respect to the conventional crystal.

3. An assembly according to Claim 1 or Claim 2, further including a second supplementary crystal disposed externally of said supplementary crystal and mounted thereon for manual rotation with respect thereto.

4. An assembly according to Claim 3, wherein said supplementary crystal and said second supplementary crystal have peripheral gripping means thereon arranged to facilitate their relative manual rotation.

5. A timepiece comprising a case, rotatable time indicating members and a dial, and a crystal assembly as claimed in any of the preceding claims whereof the conventional crystal is mounted on the case so that said crystals cover the time indicating members.

6. A timepiece as claimed in Claim 5, further including a bezel ring member supported on said case for relative rotation with respect thereto and disposed radially outwardly of both of the conventional watch crystal and supplementary watch crystal, said bezel ring and said crystals having adjacent circumferential surfaces for carrying visual indicia.

7. A timepiece as claimed in Claim 5 or Claim 6, wherein at least one of said rotatable time indicating members is a substantially transparent disc having a surface for carrying visual indicia for creating special visual effects with respect to at least one of said crystals.

8. A time piece according to any one of Claims 5 to 7, wherein said supplementary crystal includes a radial extension covering a circumferential portion of said case, said case portion and said radial extension having surfaces thereon for carrying visual indicia for producing special visual effects by relative rotation between the supplementary crystal and the case.

9. An assembly of a conventional and at least one supplementary crystal for a timepiece, substantially as hereinbefore described with reference to the accompanying drawings.

10. A timepiece substantially as hereinbefore described with reference to the accompanying drawings.

STEVENS, HEWLETT & PERKINS,
Chartered Patent Agents,
5, Quality Court,
Chancery Lane,
London, WC2A 1HZ.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1979.
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY,
from which copies may be obtained.

1 537 636 COMPLETE SPECIFICATION
2 SHEETS

This drawing is a reproduction of the Original on a reduced scale.
SHEET 1

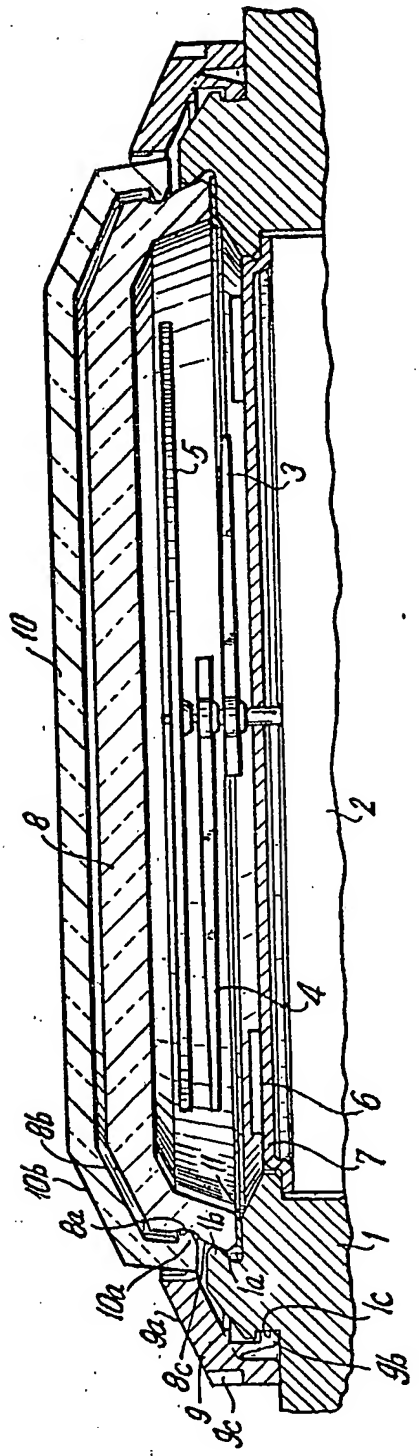


FIG.1

1 537 636 COMPLETE SPECIFICATION
2 SHEETS
This drawing is a reproduction of the Original on a reduced scale.
SHEET 2

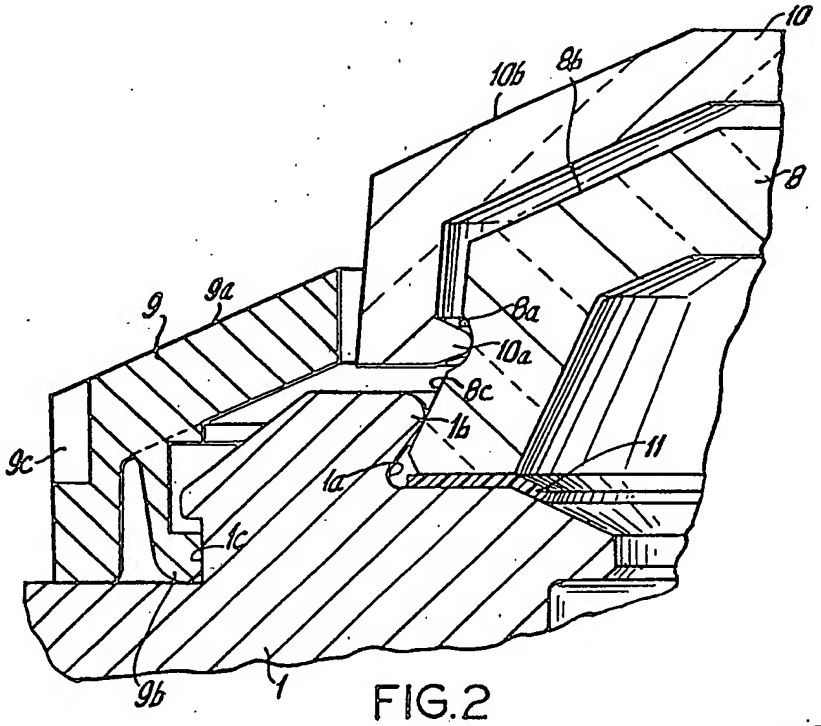


FIG.2

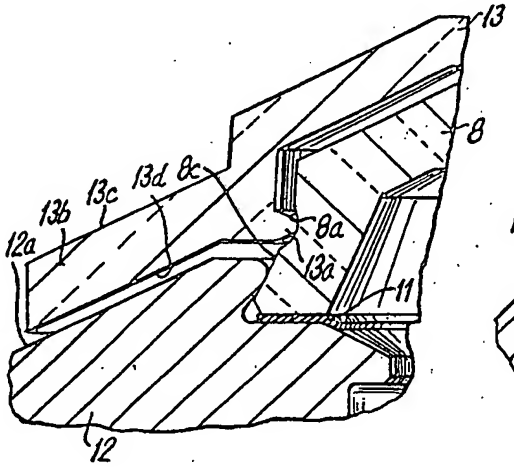


FIG.3

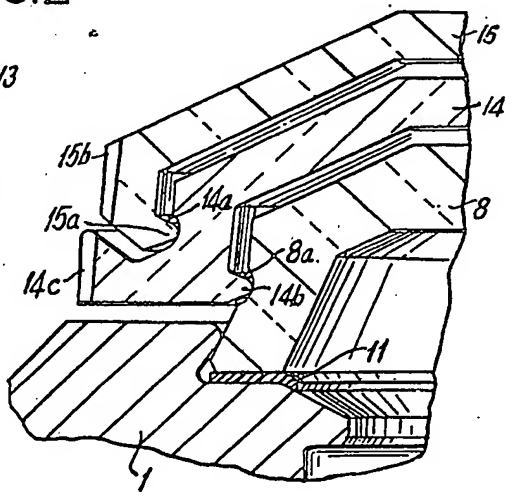


FIG. 4